

NERRS Estuaries 101 Middle School Curriculum
Activity 12: Migrating Mangroves and Marshes
Next Generation Science Standards (NGSS) Alignment

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. • Analyze and interpret data to provide evidence for phenomena. (MS-LS2-1) <i>Students analyze and interpret maps and graph, and use those data and reading material to provide evidence to describe a phenomenon.</i> [Exercise 2]</p> <p>Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. • Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. <i>Students develop an explanation and present it by creating a new map.</i> [Exercise 2]</p>	<p>LS2.A: Interdependent Relationships in Ecosystems • Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1) <i>Students develop an understanding of this DCI through an authentic example of two habitats and the populations of organisms they support, expanding and contracting because of non-living factors.</i> [Exercise 2]</p> <p>• In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1) <i>Exercise 2 teaches this concept, although the limited resource (space) is not a focus of the exercise. Space limitations could be called out specifically to support this DCI more directly.</i> [Exercise 2]</p> <p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems • Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3) <i>Exercise 1 could be significantly extended to teach this DCI and still provide the necessary introduction to salt marsh and mangrove species to support Exercise 2.</i></p> <p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience • Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)</p>	<p>Patterns • Patterns can be used to identify cause and effect relationships. <i>Patterns of expansion in habitat (seen through comparison of maps) and freezing temperatures (seen on bar graphs) are used to identify cause and effect relationships.</i> [Exercise 2]</p> <p>Cause and Effect • Cause and effect relationships may be used to predict phenomena in natural or designed systems. <i>Students use past data and understanding of cause and effect to predict future conditions.</i> [Exercise 2]</p> <p>Stability and Change • Stability might be disturbed either by sudden events or gradual changes that accumulate over time. <i>Students observe how changes in weather affect a habitat and how changes in one habitat affect another.</i> [Exercise 2]</p>

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	<i>Provides authentic evidence of ecosystems changing over time because of changes in environmental factors.</i> [Exercise 2]	